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proper to take all precautions to insure genuineness. Skulls taken from large cemeteries, or from sepulchres of whatever form erected with care, may be deemed authentic, saving always the chance of intermarriage with distinct tribes, which is usual, because the bodies of slaves are left neglected in the woods. The Chinooks, for instance, preferring to buy wives from the Chihalis or Cowlitz, tribes of Sehlsh origin. If I get time to finish my general report this winter you will find further details, supposing always you are not tired of these. I have never been able to get an authenticated skull of a white half breed. These also are never flattened, the pride of intercourse in the mother preserving to the child the attributes of the superior race."

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*March 18th.*

Vice-President BRIDGES in the Chair.

Letters were read—

From Signor A. Sauvalle, dated Havana, 10th Feb., 1856, transmitting donations to the Academy.

From Mr. Wm. P. Blake, dated Washington, 16th March, 1856, acknowledging receipt of his notice of election as a Correspondent.

Dr. Leidy presented a paper for publication from Dr. F. B. Meek and Dr. F. V. Hayden, entitled, "Descriptions of new species of Gastropoda and Cephalopoda from the Cretaceous formation of Nebraska Territory;" which was referred to Mr. Isaac Lea, Dr. Leidy, and Dr. Wilson.

Also a paper from Drs. B. F. Shumard and L. P. Yandell, entitled, "Notice of a new Fossil genus belonging to the Family Blastoidea from the Devonian Strata near Louisville, Ky." Referred to Dr. Leidy, Mr. Rogers, and Mr. Lesley.

Also a paper entitled, "Notices of Remains of extinct Reptiles and Fishes, discovered by Dr. F. V. Hayden in the 'bad lands' on the Judith River, Nebraska Territory, by Joseph Leidy, M. D." Referred to Mr. Lesley, Dr. Le Conte, and Mr. I. Lea.

Dr. Leidy remarked that he had examined the specimen transmitted by Mr. Billings, of Ottawa, U. C. Upon removing the matrix he had discovered the hind legs of a young animal, which he believed to be a seal; but whether extinct or not he could not decide.

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*March 25th.*

Vice-President BRIDGES in the Chair.

The Committee on papers by Dr. Leidy, entitled, "Descriptions of some remains of Fishes from the Carboniferous and Devonian formations of the United States;" and "Descriptions of some remains of extinct Mammalia," reported in favor of publication in the Journal of the Academy.

The Committees on Drs. Meek and Hayden's papers, read 11th and 18th insts.; on Dr. Leidy's, of 18th inst.; and on Drs. Shumard and Yandell's paper, read same date, reported in favor of publication in the Proceedings.

*Descriptions of new species of Gasteropoda from the Cretaceous formations of Nebraska Territory.\**

By F. B. MEEK AND F. V. HAYDEN, M. D.

The species indicated in the following paper comprise a portion of an extensive collection recently brought from Nebraska by one of the authors.† It is worthy of note that some of the species contained in the collection from the most recent Cretaceous beds of the upper Missouri country appear referable to genera which, according to high European authority, date no farther back than the true chalk, while many of them are closely analogous to Tertiary forms; so close indeed, that had they not been found associated in the same beds with Ammonites, Scaphites and other genera everywhere regarded as having become extinct at the close of the Cretaceous epoch, we would have considered them Tertiary species. If these beds really are equivalent to any portion of the Green sand of English geologists, it is a curious fact that we should find mingled together in them upper Cretaceous and Tertiary forms exactly as if they and those of the older Tertiary were deposited in the regular order of sequence. Such facts however are sometimes met with amongst Palæozoic formations.

The following section exhibits the order of superposition of the formations in which our Cretaceous fossils were found, and their relations to the Tertiary and older rocks.

|                    |   |                                                                                 |   |                                                                                                                          |
|--------------------|---|---------------------------------------------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------|
| Tertiary           | { | Beds of clay, sandstone, lignite, &c., containing remains of vertebrata, 400 to | { | and at places, vast numbers of plants, with land, fresh water, and sometimes marine or estuary mollusca.                 |
|                    |   | 600 ft.                                                                         |   |                                                                                                                          |
| Cretaceous system. | { | 5                                                                               | { | Gray and yellowish arenaceous clays containing great numbers of marine mollusca with a few land plants. 100 to 150 feet. |
|                    |   | 4                                                                               |   | Plastic clays with numerous marine mollusca. About 350 feet.                                                             |
|                    |   | 3                                                                               | { | Gray and yellowish calcareous marl, containing <i>Ostrea congesta</i> , fish scales, &c. 100 to 150 feet.                |
|                    |   | 2                                                                               |   | Grayish and lead colored clays having few fossils. 80 feet.                                                              |
|                    |   | 1                                                                               | { | Sandstones and clays not positively known to belong to the Cretaceous system. 90 feet.                                   |

Limestones of upper coal measures at Council Bluffs, containing *Spirifer Meuschbachanus*, *Allorisma terminalis*, *Terebratula subtilita*, *Fusulina cylindrica*, &c.

**SCALARIA CERETHIFORMIS.** Shell elongate-conical, turreted, not umbilicate; volutions seven or eight, convex, closely contiguous, traversed by numerous sharp, slightly curved costæ, less than the spaces between; surface marked by irregular lines of growth, crossed by fine, unequal, thread-like, revolving lines, as strong on the costæ as between them; suture distinct; aperture ovate, angular on the inner side above, rounded below; lip thin, curved outwards on the inner side below. Length 1.65 inches, breadth .73 inch; length of aperture .52 inch, breadth .40 inch; apical angle slightly convex, divergence about 28°.

*Locality.* Moreau trading post, No. 5 of the series, rare.

**ACTEON SUBELLIPTICUS.** Shell elongate-oval or narrow elliptical; spire somewhat elevated; volutions about four; surface polished, and ornamented by about twenty-five regular revolving striæ, composed of round punctæ so disposed as to range up and down the shell exactly parallel to the obsolete lines of growth; suture distinct; aperture narrow, curved, acutely angular on the inner side above,

\* Figures, comparisons, and remarks to be published hereafter.

† Dr. Hayden.

gradually widening downwards to about the middle, from which point it again very gradually contracts towards the narrowly rounded front; outer lip thin; columella having a single small oblique fold, outside of which there is a small umbilical groove. Length .25 inch, breadth .10 inch; apical angle regular, divergence 57°.

*Locality and position.* Crow Creek near Black hills. No. 4 of the series.

**AVALANA SUBGLOBOSA.** Shell globose or subovate; spire very short, slopes rounded; volutions four, increasing rapidly from the apex, last one very large and ventricose; surface ornamented by about thirty punctate striæ, half as wide as the elevations between on the upper part of the volutions, but much more closely crowded on the lower part of the last turn; suture linear, distinct; aperture semilunar, widest below, contracted and terminating in a smoothly rounded angle above; outer lip smooth within, faintly sinuate below and having a thick strong peristome without; inner lip thick and raised into a single prominent transverse tooth below. Length .39 inch, breadth .37 inch; length of aperture .21 inch, breadth .11 inch.

*Locality and position.* Moreau trading post. No. 5 of the series.

**NATICA ? AMBIGUA.** Shell obliquely suboval, or oblong; spire depressed-conical; volutions about four, convex, increasing somewhat rapidly from the apex, last one ventricose; surface marked by fine lines of growth and stronger parallel wrinkles, crossed by strong irregular revolving striæ; suture distinctly impressed, aperture obliquely ovate, angular above, rounded below; lips thin, apparently disunited above and abruptly deflected outward on the inner side below the small or rudimentary umbilicus. Length .50 inch, breadth .42 inch; length of aperture .34 inch, breadth of do. .24 inch; apical angle convex, divergence 81°.

*Locality and position.* Same as last.

**NATICA OCCIDENTALIS.** Shell obliquely-oval or ovate; spire elevated; volutions about five, convex; surface marked with fine lines of growth, and faint or nearly obsolete, minutely flexuous revolving lines; suture distinctly impressed; aperture ovate, straight on the inside and broadly rounded without; outer lip thin; inner lip not thickened, partly deflected over the edge of the small oblique umbilicus. Length about .97 inch, breadth .70 inch; length of aperture .56 inch, breadth .33 inch; apical angle convex, divergence 70°.

*Locality and position.* Same as preceding.

**NATICA MOREAUENSIS.** Shell obliquely-ovate; spire somewhat depressed; volutions three and a half to four, convex, last one large and ventricose; surface marked by fine lines of growth, crossed by very fine, nearly obsolete, minutely flexuous revolving lines; suture distinctly impressed or sub-channeled; aperture ovate; outer lip thin; inner lip not thickened and deflected partly over the small umbilicus. Length about .90 inch, breadth .76 inch; length of aperture .54 inch, breadth .36 inch; apical angle slightly convex, divergence 90°.

*Locality and position.* Same as preceding.

**TURBO NEBRASCENSIS.** Shell turbinate, length and breadth about equal; spire broadly conical; volutions about five, rounded, gradually increasing from the apex; surface ornamented by fine revolving striæ, crossed by delicate lines of growth, becoming distinct oblique wrinkles along the suture and round the umbilicus, the whole presenting an elegant cancellated appearance under a lense; suture distinctly impressed; aperture round; umbilicus moderate, round. Length .25 inch, breadth .26 inch; diameter of aperture .12 inch; apical angle somewhat convex, divergence 53°.

*Locality and position.* Yellow Stone river, one hundred and fifty miles from mouth. No. 4 of series.

**TURBO TENUILINEATUS.** Shell oblong or suboval, oblique, thin; spire somewhat elevated, acute at the apex; volutions about five, rounded, increasing rapidly from the apex; last one ventricose, extended in front; surface marked

with distinct lines of growth, crossed by rounded, thread-like lines, generally less than the spaces between, and somewhat irregular in size; between the latter there are also very fine parallel revolving striae, only visible under a lens; suture apparently canaliculate; aperture broad ovate or oval; outer lip thin; inner lip straight above, and distinctly curved outwards below at its junction with the outer lip near the small umbilicus. Length .84 inch, breadth .68 inch; apical angle regular, divergence  $78^{\circ}$ ; length of aperture .50 inch, breadth of do. .36 inch.

*Locality.* Moreau trading post. No. 5 of the series.

*ROSTELLARIA BIANCULATA.* Shell elongated; spire elevated, acutely conical; volutions seven or eight, convex, crossed by small nearly obsolete folds, last one having two distinct revolving carinae on the middle, which diverge in passing upon the expanded lip, and terminate in two more or less salient angles at its outer margin; surface marked by fine very faint lines of growth, crossed by small revolving thread-like lines about equal the intermediate spaces, on the spire and upper part of the last turn, but more distinct and alternating with smaller ones on the lower part of the body volution; suture linear, sharply impressed; aperture unknown; outer lip thin, expanded, and extending more or less up the spire. Length .53 inch, breadth exclusive of the lip .21 inch; apical angle regular, divergence  $37^{\circ}$ .

*Locality and position.* Yellow Stone river, one hundred and fifty miles from mouth. No. 4 of the series.

*FUSUS DAKOTAENSIS.* Shell fusiform; spire conical, somewhat elevated; volutions about six, flattened or concave above, last one abruptly contracted into the canal below, and ornamented on the middle by two elevated revolving nodose carinae, between which faint, broadly rounded, vertical folds pass from node to node. On the spire only the upper and most prominent carina is seen, while a third less distinct parallel ridge passes round lower down on the body whorl; whole surface marked by fine, regular lines of growth, crossed by rounded revolving lines, one of which, about midway between the two large carinae, is stronger than the others; suture linear; aperture broad oval or ovate. Length from junction of canal and aperture to apex 1.03 inches, breadth .92 inch; length of aperture .48 inch, breadth .42 inch; apical angle regular, divergence  $51^{\circ}$ .

*Locality and position.* Moreau trading post. No. 5 of the series.

*FUSUS GALPINIANUS.* Shell small, fusiform; spire conical, acute; volutions five and a half to six, convex, last one sloping somewhat abruptly below into the short canal; surface marked by fine flexuous lines of growth, crossed by rounded little revolving bands or lines scarcely larger than the grooves between. About fourteen of these bands may be counted on the second volution; suture distinct; aperture narrow-oval, acutely angular behind, and sloping into the canal in front; outer lip thin and sharp; inner lip lying close upon the tortuous columella. Length 1.05 inches, breadth .42 inch; length of aperture (including canal) .53 inch, breadth .18 inch; apical angle regular or slightly convex, divergence  $32^{\circ}$ .

The above species is dedicated to Mr. C. E. Galpin, of Am. Fur Co.

*Locality and position.* Same as last.

*FUSUS CONTORTUS.* Shell obliquely fusiform; spire elevated conical, acute at the apex; volutions five and a half to six, distinctly concave above, convex below, and ornamented by indistinct flexuous folds, which swell out into a row of prominent nodes round the middle; last volution gradually contracting below into a short canal; surface marked by fine flexuous lines of growth crossed by numerous elevated thread-like revolving lines, a little less than the spaces between; suture distinct; aperture ovate, widest above the middle, angular behind, and tapering forward; outer lip thin; inner lip closely folded upon the somewhat tortuous columella. Length about .90 inch, breadth .48 inch; length of aperture and canal .56 inch, breadth .20 inch; apical angle convex, divergence  $45^{\circ}$ .

*Locality.* Same as the preceding.

**FUSUS CULBERTSONI.** Shell elongate fusiform; spire elevated conical, acute; volutions about seven, convex, increasing gradually from the apex, and crossed nearly at right angles to the suture by six or seven strong rounded folds, which gradually become obsolete on the last near the aperture; last volution tapering gracefully and obliquely into the canal, which is of moderate length; surface marked by irregular lines of growth, crossed by flattened or rounded lines, somewhat larger than the spaces between; suture distinctly impressed, and when viewed from above is seen to deviate from a regular curve in following the waving outline of the folds; aperture lanceolate or narrow oval, acutely angular above and tapering gradually below. Length about 1.68 inches, breadth .50 inch; length of aperture and canal about .90 inch, breadth .23 inch; apical angle convex, divergence 28°.

We dedicate this species to Mr. Alexander Culbertson, of the Am. Fur Co.

*Locality and position.* Same as preceding.

**FUSUS FLEXUOCOSTATUS.** Shell fusiform; spire somewhat elevated, acute at the apex; volutions six to six and a half, convex, traversed by strong, simple, flexuous folds nearly equalling the spaces between, and terminating above in small nodes so as to leave a shallow spiral groove below the suture; last whorl somewhat ventricose; surface ornamented by distinct lines of growth, crossed by small, elevated, thread-like, revolving lines, equal the spaces between on the upper part of the volutions, but more distant on the lower part of the last one; between the revolving lines and parallel with them, fine striæ may be seen by the aid of a magnifier; suture unknown; aperture oval or ovate. Length 1.05 inches, breadth .61 inch; length of aperture exclusive of canal .48 inch, breadth .30 inch; apical angle 46°.

*Locality and position.* Moreau river. No. 5 of series.

**FUSUS NEWBERRYI.** Shell fusiform, thick; spire conical; volutions five, flattened or concave above, convex below and ornamented round the middle with a row of more or less prominent nodes, which are sometimes prolonged on the last one into indistinct folds below; surface ornamented by irregular flexuous lines of growth, crossed by round, elevated, thread-like, revolving lines, sometimes greater and sometimes less than the spaces between; suture linear; aperture narrow ovate, angular above and scarcely distinct from the short canal below; outer lip thin or bevelled; inner lip closely spread upon the columella. Length 1.43 inches, breadth .81 inch; length of aperture (including the canal) .87 inch, breadth .32 inch; apical angle convex, divergence 55°.

We dedicate this species to Dr. J. S. Newberry, of Cleveland, Ohio.

*Locality and position.* Moreau river and Fox Hills. No. 5 of series.

**PYRULA BAIRDI.** Shell pyriform; spire depressed; volutions five, rapidly increasing from the apex, flattened or slightly concave above and on the outside; last one large and ventricose, ornamented on the outside by two to three more or less prominent, revolving, nodose carinæ, only the upper of which is visible on the spire; surface marked by strong lines of growth, crossed by numerous elevated revolving lines, less than the spaces between, and sometimes assuming, on the outer and lower part of the last volution, the size of more distinct ridges; suture narrow, channeled; aperture ovate, abruptly contracted into the long canal below; columella tortuous, and deeply curved round the aperture; outer lip bevelled; inner lip thinly spread over the columella round the aperture, but leaving an umbilical groove about half way down the canal. Length 3.50 inches, breadth .2 inches; length of aperture (including the canal) .3 inches, breadth 1.08 inches; apical angle nearly regular, divergence 114°.

Dedicated to Prof. Spencer F. Baird, of the Smithsonian Institution.

*Locality and position.* Same as last.

**FASCIOLARIA CRETACEA.** Shell small elongate, fusiform; spire elevated conical; volutions five to six, convex, last one a little more than half the entire length of

the shell, contracted below into a tapering canal; surface marked with flexuous lines of growth and little flat revolving bands about four times as wide as the grooves between; suture distinct; aperture narrow oval, angular above and narrowing gradually below; columella tortuous and having five small, oblique folds near the middle of the aperture.

*Locality and position.* Same as preceding.

**FASCIOLARIA BUCCINOIDES.** Shell elongate-oval or subfusiform; spire conical, acute; volutions five to five and a half, convex, last one somewhat ventricose and contracted below into a short canal; surface ornamented with fine regular lines of growth and small parallel folds, which are crossed by regular, round, elevated revolving bands, equal to or greater than the spaces between. Of these bands about fourteen may be counted on the second volution; suture distinctly impressed; aperture narrow, oval, or semi-elliptical; outer lip faintly grooved, and at intervals of about once for each turn becomes thickened and crenulated on the inside; inner lip closely spread upon the tortuous columella, and forming about the middle of the aperture two distinct oblique folds. Length .96 inch, breadth .49 inch; length of aperture and canal about .60 inch, breadth .23 inch; apical angle convex, divergence  $54^{\circ}$ .

This shell has much the general appearance of a *Buccinum*, having the form and surface markings of *B. decussatum* (Lamk.) an Eocene species from the Paris basin, but differs from the genus *Buccinum* in having two distinct folds on the columella, being in this respect more like *Fasciolaria*. The folds on the columella are not stronger, however, than we see in *B. fusiformis* of Deshayes, another Tertiary species. We had once concluded to refer it with doubt to the genus *Buccinum*, but refer it to the genus *Fasciolaria*, at the suggestion of Dr. Gould, to whom we sent specimens. This genus, according to D'Orbigny, made its first appearance in the old world during the deposition of the true chalk.

*Locality and position.* Moreau and Fox Hills. No. 5 of the series.

**BUCCINUM? NEBRASCENSIS.** Shell oval, thin; spire very short; volutions three to three and a half, convex, rapidly increasing from the apex, last one very large and somewhat ventricose; surface marked with distinct lines of growth, which are crossed by flattened, revolving bands, much wider on the upper part of the volutions than the shallow grooves between, but about equal to them on the lower part of the last turn. About seven or eight of these bands may be counted on the second volution; suture narrow, channeled; aperture large, sub-elliptical, angular above, and terminating in a rounded notch in front, the form of which is well defined by a sudden curve in the lines of growth on a broad spiral ridge round the outer edge of the pillar lip; outer lip very thin; inner lip thinly spread over the extremely tortuous columella. Length .77 inch, breadth .58 inch; length of aperture .61 inch, breadth .36 inch; apical angle convex, divergence  $105^{\circ}$ .

Being in doubt in regard to the generic relations of this shell, we sent specimens of it, and a few others, to the distinguished conchologist, Dr. Augustus A. Gould, of Boston, from whom we received in regard to it, the following remarks: "Its general form reminds one of *Natica*, and its revolving striae of the subgenus *Naticina*. If we look at the base, however, we find a revolving ridge which is never found in the *Naticidae*, but is peculiar to the *Buccinidae*." Dr. G. further remarks that with the exception of the revolving striae it agrees very nearly with the genus *Pseudoliva* of Swainson, which is not known to date back further than the Eocene. In many respects it resembles the Eocene *Buccinum obtusum* of Deshayes, from the Paris basin, which forms the type of an Eocene genus established by D'Orbigny under the name of *Sulco buccinum*. Our shell has the form, revolving striae, &c., of some species of D'Orbigny's genus, but wants the strong revolving sulcus, which is one of its principal characters. For the present we refer it to the genus *Buccinum*, though we suspect it may form the type of a new genus.

*Locality and position.* Same as last.

**CAPULUS FRAGILIS.** Shell broadly conical, very thin; apex elevated, central; slopes slightly convex, divergence  $80^{\circ}$ ; surface marked with fine, closely arranged, concentric striae; aperture circular. Diameter of base 1.22 inch; height of apex about .74 inch.

It is with some doubt we refer this species to the above genus, as our specimen only consists of an internal cast with a few fragments of shell adhering; no muscular impressions are visible upon it, but the nipple at the summit appears to have occupied the interior of an attenuated and laterally curved apex.

*Locality and position.* Fox Hills. No. 5 of the series.

#### Genus HELCION (Montfort).

We have not yet had an opportunity of seeing the interior of any of the following patelliform shells, but, judging from external characters, they appear referable to the above genus as defined by D'Orbigny. They are all strictly symmetrical, with, as far as can be ascertained, thin, smooth, and nearly, if not quite entire borders.

**HELCION SEXSULCATUS.** Shell patelliform, longer than wide; apex between the centre and anterior margin depressed; lateral slopes nearly straight, divergence  $100^{\circ}$ ; anterior slope slightly concave, and having two broad shallow grooves radiating from the apex to the antero-lateral edges; posterior slope convex, and having four broad shallow grooves radiating from the apex to the posterior and lateral edges; base or aperture oval; surface unknown. Length unknown, breadth about 1.29 inch, height .48 inch.

*Locality and position.* Yellow Stone, one hundred and fifty miles from mouth. No. 4 of the series.

**HELCION PATELLIFORMIS.** Shell patelliform, thin, a little longer than wide; apex somewhat elevated, nearer the centre than the anterior margin; lateral slopes nearly straight, divergence about  $90^{\circ}$ ; anterior slope straight or slightly concave, posterior convex, divergence of the two about  $103^{\circ}$ ; surface marked with fine concentric lines of growth, which are crossed by very faint indications of fine radiating striae, and on the anterior side by three or four scarcely perceptible, radiating carinae (the latter not always present); aperture broad, oval. Length 1 inch, breadth .84 inch, height .44 inch.

*Locality and position.* Same as last.

**HELCION ALVEOLUS.** Shell patelliform, thin, longer than wide; apex depressed, nearly central; lateral slopes convex and forming an angle of  $80^{\circ}$ ; posterior and anterior slopes about equally convex, divergence  $120^{\circ}$ ; surface marked with very fine concentric lines of growth; base or aperture elliptical or subovate, Length .63 inch, breadth .43 inch, height .17 inch.

*Locality and position.* Yellow Stone river. No. 4 of series.

**HELCION SUBOVATUS.** Shell patelliform, longer than wide; apex depressed, situated about half way between the centre and the anterior margin; lateral slopes convex, and forming an angle of  $80^{\circ}$ ; posterior slope more convex than the anterior, divergence of the two  $104^{\circ}$ ; surface marked by faint, irregular, concentric undulations and imbricating lines of growth; base or aperture oval or subovate, extremities broadly rounded, the posterior end being a little wider than the anterior. Length 1.16 inches, breadth .81 inch, height .39 inch

*Locality and position.* Same as preceding.

**HELCION CARINATUS.** Shell very obliquely conical or bonnet-shaped, thin; apex elevated near the anterior margin, and directed forward; anterior and antero-lateral slopes profoundly concave; posterior slope convex above and flattened or concave below. A single strong, rounded carina passes from the apex down the posterior slope, becoming gradually obsolete near the margin, while two or three much fainter ones radiate from the apex down the postero-

lateral slopes on each side of it. Six small indistinct striæ radiate from the apex, two of which are directed forwards and outwards, and four backwards and outwards; faint, irregular, concentric undulations dimly indicate the progressive stages of growth; surface otherwise smooth; aperture circular. Diameter of aperture 1.93 inches, height of apex .80 inch.

*Locality and position.* Same as preceding.

*DENTALIUM FRAGILIS.* Shell very thin, slender, gently curved from apex to base; surface ornamented by rounded, thread-like, longitudinal lines, which are crossed somewhat obliquely upwards from the inner to the outer side of the curve by very fine regular lines of growth. The longitudinal lines terminate abruptly a little below the apex, (where they number about fourteen) and increase in number by implantation, and diminish in size and regularity towards the larger end, so as to become nearly obsolete on the lower half of the shell; aperture circular. Diameter at the apex .05 inch, do. of a fragment .85 inch, below apex .13 inch, do. of largest fragment .19 inch; thickness of shell .02 inch; apical angle 3°.

The above species is closely allied to *D. gracilis*, Hall and Meek, (vol. 5, new series, Trans. Acad. Arts and Sciences, Boston) but differs in having much less prominent longitudinal striæ, and not more than half as thick a shell; while the aperture, which in the former is nearly always subcircular, in the present species is exactly circular.

*Locality and position.* Yellow Stone river, one hundred and fifty miles above mouth. No. 4 of section.

*BULLA VOLVARIA.* Shell narrow ovate, tapering gradually from below the middle upwards, and extended obliquely below; spire hidden, sometimes umbilicate; surface ornamented by faint lines of growth and shallow revolving striæ, about one fifth as wide as the spaces between on the middle of the shell, but more closely crowded and irregular at the lower and upper extremities. Occasionally a much finer stria occupies one of the spaces between the others; aperture long, narrow, gently curved, rising above the summit of the body, about half as wide above the middle as below; lip thin, closely folded over the rudimentary umbilicus. Length .66 inch, breadth .36 inch.

*Locality and position.* Moreau trading post. No. 5 of section.

*BULLA MINOR.* Shell minute, ovate, or elliptical; spire hidden, umbilicate; surface marked by elevated, sharp, revolving striæ, about equal to the grooves between; fine sharply elevated lines of growth, more distinct in the grooves than on the elevations, mark the surface in the other direction; aperture large, rising above the summit of the body, narrow and obtuse above, and widening gradually below. Length about .10 inch, breadth .05.

*Locality and position.* Moreau trading post. No. 5 of the series.

*BULLA OCCIDENTALIS.* Shell oval or ovate, thin, ventricose, widest a little above the middle, rounded at the summit and somewhat obliquely extended in front; spire hidden, umbilicate; surface unknown. Indistinct lines of growth, and stronger revolving striæ less than the spaces between are seen on the cast; aperture curved, narrow behind, rising above the summit of the body, and widening chiefly on the inner side below; lip slightly curved outwards round the lower part of the aperture. Length .44 inch, breadth .28 inch.

*Locality and position.* Yellow stone river. No. 4 of the series.

We have other new species of Gasteropoda from the Cretaceous formations of the upper Missouri, but refrain from indicating them out of deference to friends having specimens of the same which they wish to describe.

*Descriptions of new species of Gasteropoda and Cephalopoda from the Cretaceous formations of Nebraska Territory.*

By F. B. MEEK and F. V. HAYDEN, M. D.

**TURRITELLA CONVEXA.** Shell acutely conical; volutions flattened convex; suture linear, indistinct; surface marked with fine lines of growth; aperture ovate, acutely angular above, rounded below. Length unknown; breadth of largest specimen .39 inch; apical angle very convex, divergence 208.

This species may at once be distinguished from any other shell known to us from this region, by the convexity of the lateral slopes of the spire, and the absence of revolving lines.

*Locality and position.* Yellow Stone river, one hundred and fifty miles from mouth. No. 4 of the series.

**TURRITELLA MOREAUENSIS.** Shell terete; spire elevated; volutions (number unknown) flattened, increasing very gradually from the apex, and ornamented by elevated thread-like revolving bands or lines about equal the intermediate spaces; while sharply elevated, regular, and somewhat distant, lines of growth traverse the whorls in the other direction: suture linear and sharp; aperture subquadrate, forming nearly a right angle on the inner side above, and terminating in a distinct notch on the columellar side below. Length (unknown,) breadth .10 inch; length of aperture .07 inch, breadth .04 inch; apical angle regular, divergence 9°.

We have only incomplete specimens of this species, consisting of from six to eight volutions, of which there were probably not less than ten. On the last whorl, there is a fourth smaller revolving line below the others, and still lower, several very fine revolving striæ. The lines of growth, are much more distinct between, than upon the revolving lines on all parts of the shell.

*Locality and position.* Moreau river. No. 5 of the series.

**BELMNETELLA? BULBOSA.** Shell elongated, cylindrical, widening at the opening, then somewhat contracted, and again enlarging below the middle, whence it gradually tapers to a point; alveolus having a small groove down the dorsum, and marks of transverse septa round the sides; substance of the shell fibrous,—fibers radiating at nearly right angles from the central linear axis to the exterior. Phragmacone tapering regularly at an angle of 20° from the larger extremity to the apex, where it terminates in a minute but distinct bulb-like expansion; section circular or broad oval, septa faintly sinuate on the dorsum and separated by spaces equalling about one-sixth the diameter of the shell; about twenty-eight of the septa may be counted in the space of half an inch from the apex. Length unknown; diameter of largest fragment .33 inch.

We have of this species perfect specimens of the phragmacone, but having only seen longitudinal sections, and worn fragments of the external horny shell, we know nothing of its surface markings, nor whether or not it possessed the longitudinal slit characteristic of the genus. The groove down the inner side of the alveolar cavity, however, is well marked in some of the fragments. We were at first inclined to refer it with doubt to *Belmnetella mucronata* (D'Orb.) which has already received such a multiplicity of names, but a careful comparison with authentic specimens of that species from New Jersey convinces us it is different, and may be at once distinguished by the small bulb at the apex of the phragmacone, which always leaves its impression at the point of the alveolar cavity. So far as we know, this genus is, in the old world, confined to the true chalk.

*Locality and position.* Moreau river. No. 5 of the series.

**AMMONITES HALLI.**—Shell large, laterally compressed, rounded on the dorsum; umbilicus rather small, deep, somewhat funnel shaped, exhibiting one-third to one-fourth, of each of the inner volutions; surface ornamented by numerous small, slightly elevated, costæ, which cross the volutions more or less obliquely. About one-fourth of those crossing the dorsum reach the umbilicus,

around which on the outer whorl, they swell out into a row of prominent transversely elongated nodes or ridges, while the intermediate ones die out, or coalesce with the others at various distances across from the periphery.

Septa profoundly lobed, and exceedingly complicated. All the margins of the branches of the lobes, sharply, and those of the saddles obtusely, digitate. Dorsal lobe ornamented at the extremity with four principal branches, the two terminal of which are larger than the others, and again divided into two branchlets. Dorsal saddle much larger than the superior lateral lobe, inequally divided at the summit by the slender digitate auxiliary lobe into two branches, that on the dorsal side being much larger than the other, and again once or twice deeply divided. Superior lateral lobe much smaller than the dorsal saddle, and having four principal divisions, the two terminal of which are greatly larger than the others, and each again divided into two branchlets, of which the two lateral are much smaller than the others. Superior lateral saddle a little smaller than the superior lateral lobe, deeply divided at the summit into two nearly equal branches, each of the divisions being again divided into two or three parts. Inferior lateral lobe small and slender, having four or five alternating branches. The succeeding lobes are very small and simply bifid or trifid at the extremity.

It is exceedingly difficult, if not impossible, from our imperfect specimens, to determine definitely whether this is *Scaphite* or an *Ammonite*, though we are inclined, in consequence of its large size, to think it must be the latter. Our description is made out from a young shell measuring four and a half inches across the disc, while we have fragments of other individuals which must have been at least four times as large; hence we infer, in adult shells of large size, the lobes of the septa may have been even more complicated than those of the specimen investigated by us.

From the same bed we have a large distorted specimen, apparently of the same species, which is less compressed and has stronger costæ. It also appears to want the row of nodes round the umbilicus. As far as we have been able to see its septa, they appear to be identical with those of the above species; consequently we are disposed, at present, to regard it as only a variety of the same. It is possible, however, a careful comparison of better specimens may prove them to be distinct; if so, we would propose for it the specific name of *amplus*.

This species is named after Prof. James Hall, of Albany, N. Y.

*Locality and position.* Yellow-stone River, one hundred and fifty miles above the mouth, and one hundred and fifty miles above Milk River, No. 4 of series.

*ANCYLOCERAS? NEBRASCENSIS.* Of this species we have but a fragment, about two inches in length. It makes a short spiral curve like *Helioceras* (D'Orb.) and is ornamented with small (bifurcating?) annular costæ, more distinct on the ventral than dorsal side. The specimen is too imperfect to show the details of the lobes, though we can see they are very complicated, and sharply digitate. Section circular, diameter .90 inch.

This and the following species would not go into the genus *Ancyloceras*, as defined by D'Orbigny, but appear to be closely related to forms, so referred by Pictet and others.

*Locality.* Iquor creek, north fork, Cheyenne. *Position.* No. 4 of the series.

*ANCYLOCERAS? CHEYENENSIS.* The only specimen of this species we have seen, is a section of the outer chamber, about two and a half inches long. It makes a broad spiral curve, and is ornamented by prominent rounded annular costæ, which encircle the shell very obliquely, and are smaller and more approximate on the inner side of the curve, than without. Costæ having two prominent nodes, at which point they sometimes bifurcate; the nodes being so arranged as to form two parallel rows up and down the dorso-lateral portion of the shell. Section circular, diameter 2.40 inches.

The above species resembles somewhat *Ancyloceras? Nicolletii* of Hall and Meek (Vol. 5, new series, Trans. Am. Acad. Arts and Sciences, Boston,) but has much larger and more prominent costæ, which pass less obliquely round the shell, and do not bifurcate so frequently, while the nodes are larger, and the curve of the

shell much broader. From *Ancyloceras? aproximans*, Con. (Proceedings of the Phila. Acad. p. 266,) it differs in having broadly rounded, instead of acute costæ.

*Locality and position.* Mouth Cheyenne river. No. 4. of series.

*Notices of remains of extinct Reptiles and Fishes, discovered by Dr. F. V. Hayden in the Bad Lands of the Judith River, Nebraska Territory.*

By JOSEPH LEIDY, M. D.

1. *PALÆOSCINCUS COSTATUS*, Leidy.

The genus and species are founded on a single specimen of a tooth of a lacertian, discovered by Dr. Hayden.

The crown of the tooth is palmate, with eight radiating costæ terminating at the margin in more or less developed points. The fang is flattened cylindrical, and is hollow; and it expands into a ridge surrounding the base of the crown. Breadth of the crown 4 lines, length  $2\frac{1}{4}$  lines; width of the fang 2 lines, thickness 1 line. Whole length of the specimen 4 lines.

2. *TRACHODON MIRABILIS*, Leidy.

The genus and species are founded upon specimens of teeth, generally very much worn and in a fragmentary condition, of a herbivorous lacertian reptile allied to the *Iguanodon*, discovered by Dr. Hayden.

One of the specimens of teeth is an unworn crown, about 14 lines long and 5 lines in diameter at its thickest part. It has the form of a slightly bent hexahedral column, bevelled off convexly from the summit of the tooth internally to the base externally. The outer surface is smooth, and has a prominent median ridge and prominent subacute lateral borders. The inner surface of the tooth, presenting the five smaller sides of the column, is quite roughened with irregular granulations. The base of the tooth is hollow, and its walls at the broken border of the specimen are  $1\frac{1}{2}$  lines thick.

In another and much worn specimen of a tooth, which had apparently been shed, and is now  $4\frac{1}{2}$  lines long; the triturating surface is slightly concave and pentahedral, with concave sides, and is 4 lines in diameter. The two portions of the outer surface incline much more from the median ridge than in the preceding specimen; and the base of the tooth is hollowed, apparently from the pressure of a successor.

3. *TROODON FORMOSUS*, Leidy.

The genus and species are founded on a single specimen of a tooth of a lacertian, discovered by Dr. Hayden.

The specimen consists of a compressed, curved, conical crown with trenchant edges. The outer side is more convex than the inner, which is worn off towards the apex from friction of the opposing tooth. The trenchant edges are coarsely denticulated; the denticulations themselves being compressed conical, with trenchant edges, and are bent in such a manner that their apices are directed towards the summit of the crown. The base of the tooth is hollow, and is 2 lines wide and  $1\frac{1}{4}$  lines transversely; and the length of the specimen is 3 lines.

4. *DEINODON HORRIDUS*, Leidy.

This genus and species are founded on a number of specimens, consisting of fragments of teeth of a saurian reptile, discovered by Dr. Hayden.

Nine of the specimens referred to consist of crowns, of teeth or of their summits, which resemble those of *Megalosaurus*, being compressed conical and curved, and having trenchant, dentated borders. They are generally thicker in relation to their breadth than in *Megalosaurus*, which might only be a specific distinction, were it not that there are several other teeth in the same collection apparently of the same animal, but quite peculiar in form.

One of the specimens is a curved conical crown, nearly circular in transverse section, having a prominent dentated ridge on each side. A second specimen is a crown, demi-elliptical in transverse section, with the posterior borders dentated. A third specimen is a small fragment of a very large tooth, apparently

with nearly the same form as the latter; and a fourth specimen is a portion of the crown of a tooth, demi-elliptical in transverse section, with the posterior borders elevated but not dentated.

Had the different forms of teeth above indicated been obtained from different localities, they might have been referred to at least four distinct genera, but having been discovered together, and possessing the same structural appearances, I suspect them to have belonged to one and the same species.

The largest specimen resembling the teeth of *Megalosaurus* in its present condition, is  $1\frac{1}{2}$  inches long from the apex,  $\frac{1}{2}$  of an inch broad at base, and 5 lines thick. One of the specimens, which is demi-elliptical in section, is over an inch in length from the apex, 8 lines broad at base, and  $3\frac{1}{2}$  lines wide at the posterior surface. Another specimen, apparently with the same form as that just indicated, in its perfect condition appears to have had the crown over two inches in length, nearly an inch in breadth, and about half an inch in width posteriorly.

#### 5. CROCODILUS HUMILIS, Leidy.

The species is founded on ten specimens of shed crowns of teeth, apparently of a small species of crocodile. The largest specimen is  $7\frac{1}{2}$  lines long and  $3\frac{1}{2}$  lines in diameter at base, which is nearly circular. Another specimen is 7 lines long and  $2\frac{1}{2}$  lines in diameter at base; and a third specimen is 6 lines long and  $3\frac{1}{2}$  lines in diameter at base. These are all moderately curved conical, nearly circular in transverse section, with the two usual internal acute ridges, and with the intervening surfaces slightly striate or nearly smooth. The crown of a posterior tooth is compressed, mammillary in form,  $2\frac{1}{2}$  lines long and  $2\frac{1}{2}$  wide at base, with the summit obtuse, and the sides finely and longitudinally rugose.

#### 6. TRIONYX FOVEATUS, Leidy.

The species is founded on fragments of several costal and sternal plates. The exterior surface of the costal plates is covered with pits, excepting close to the margins; and the pits are small and round at the vertebral extremity, and gradually increase in size outwardly and become antero-posteriorly oblong oval and reniform. A vertebral fragment of a third or fourth costal plate, a little over an inch in length, is 11 lines wide and 2 lines thick. Small fragments of the sternal plates present an exterior surface covered with broken vermicular ridges and tubercles separated by wide intervals. Fragments of a hyposternal plate are 3 lines in thickness.

#### 7. LEPIDOTUS OCCIDENTALIS, Leidy.

A species proposed on five specimens of thick lozenge-shaped scales, with the root prolonged in the direction of the long diameter. The enamelled surface of the scales is smooth and shining. The largest one has its sides about 4 lines long, the smallest one about  $2\frac{1}{2}$  lines long.

#### 8. LEPIDOTUS HAYDENI, Leidy.

A species proposed on a single specimen of a thick oblong square scale, the long sides of which measure 5 lines, and the short sides  $3\frac{1}{2}$  lines. The root projects forward from one of the long sides, and the enamelled surface of the scales is covered with parallel square lines.

This species is named in honor of Dr. Hayden, who collected the remains characterized in this paper; and which remains, I suspect, indicate the existence of a formation like that of the Wealden of Europe.

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*Notice of a new Fossil Genus belonging to the Family BLASTOIDEA, from the Devonian strata near Louisville, Kentucky.*

By B. F. SHUMARD, M. D., and L. P. YANDELL, M. D.

The remarkable Crinoid, now for the first time brought to the notice of Palæontologists, was discovered by us as early as 1847, in a gray sub-crystalline limestone on Bear Grass Creek, near Louisville, Kentucky, associated with characteristic fossils of the Devonian system. At that time we had observed only detached plates of the genus, which did not permit us to recognize its most

important peculiarities, and we regarded it as being merely a species of *Pentremites* (Say.) analogous to (*P. Elæacrinus*) *Verneuli* (Römer.) Afterwards, through the politeness of S. A. Casseday, Esq., of Louisville, we were put in possession of two individuals in a more perfect state of preservation, and these, with some specimens since found by ourselves, have furnished the material from which we are enabled to add a new and interesting genus to the family Blastoidea.

ELEUTHEROORINUS, *Nov. Gen.*

Agreeable to the plan pursued by Messrs. D'Koninck and Le Hon, we give as the formula of the genus—

*Basal pieces*, 3.—One small, two irregular and very much elongated.

*Radial pieces*,  $1 \times 5$ .—Four-forked, occupying nearly the whole length, one short and not forked.

*Interradial pieces*,  $1 \times 5$ .—Small.

*Pseudoambulacral areas*, 5.—Four linear extending nearly the entire length of the calyx, one short, sub-triangular, situated on the summit plane.

*Column*, none.

*Ovarial apertures*, 8 (?)

*Generic characters*.—The calyx is of an elliptical form, truncated at summit and sub-triangular at base.

The *base* is very irregular in form, sub-triangular at its lower part, and prolonged on one of its sides to a remarkable length. It consists of three pieces, one of which is small, lozenge-shaped; the other two are precisely alike, very large and prolonged nearly to the middle of the calyx. These latter pieces are joined together in the median line by a straight suture, with which their external edges are sub-parallel, except the inferior fifth, which exhibits a small angular fold, directed obliquely forwards to articulate with the inferior edges of the single basal piece. The superior edge of this fold is also emarginated to receive the extremity of an elongated radial piece.

*Radial pieces*.—Four are non-symmetrical, occupy nearly the entire length of the calyx, and are channelled almost to the base for the reception of the pseudo-ambulacræ. The middle pair alternate with the single basal, the exterior ones repose on the emarginated edges of the fold of the large basals. The fifth radial piece scarcely exceeds one-half the length of the others, though it is much wider. It rests on the upper edges of the large basals and between the superior half of two of the long radials. Its upper edge reaches to the level of the summit plane. The surface is destitute of a pseudo-ambulacral groove.

*Interradial pieces*, five, small, alternating with the radials. Three of them are somewhat lozenge-shaped; two irregular in form, articulate, with the short radial piece.

*Pseudoambulacral areas*, four are linear, commence at the central summit, opening and descend nearly to the base; the fifth is triangular and lies horizontally on the summit plane just within the edge of the short radial piece.

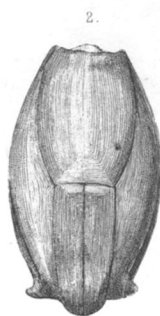
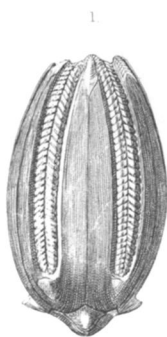
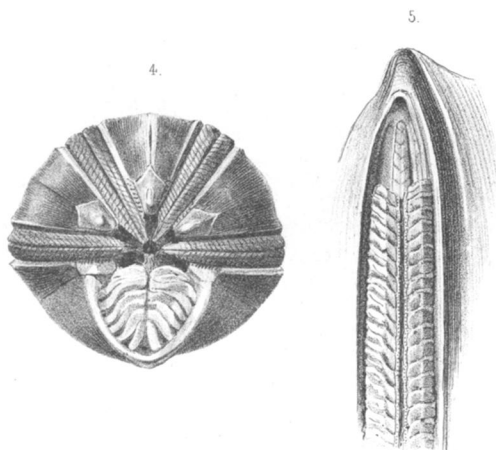
*Ovarial apertures*. Only eight of these openings are visible in the specimens under examination; two are situated at the extremity of each lozenge-shaped interr radial, each pair being divided by a mesial septum; but at the extremity of each irregular interr radial there is apparently merely a simple round opening without any visible septum. No *anal* opening is to be seen in our specimens.

*Mouth* nearly central.

*Column*. No trace of an aperture or articular facet exists at the base to indicate that the genus possessed a column.

ELEUTHEROCRINUS CASSEDAYI. *Nov. sp.*

The body of this species is of an ellipsoidal form, truncated at summit, sub-triangular below, and flattened on that portion of the circumference occupied by the large basals and short radial. The surface of all the principal pieces is marked with numerous delicate striæ, slightly flexuous and running in a direction nearly parallel with the edges.



*Basal pieces.* The outer long ones descend lower than the middle pair and the extremities of their pseudoambulacral fields are nearer the inferior extremities of the pieces. Their internal limb is narrow, lanceolate and obliquely truncated above; the external one is broadest, obtusely triangular, and bent backwards at nearly right angles, to unite with the long basals and short radial, forming with these a flattened convex surface, whose transverse diameter equals the total width of the calyx. The middle pair, or those standing over the small basal, are more regular in form than the outer ones, their branches narrow and equal. The internal edges of all the branches of the long radial pieces are limited by a fine carina, terminating below in a triangular projection, on which rest the extremity of a pseudoambulacral field. The lateral sutures are also marked by a fine carina. The short radial piece is sub-pentagonal and angulated in the middle; its length and breadth about equal. Below it rests by a double concave edge on the extremities of the long basals; the lateral edges are arched, the outline of the superior edge somewhat V-shaped.

*Interradial pieces.* The three regular ones are swelled and rounded at the apex, and terminate below in three salient angles; the lateral edges are strongly crenulated. The irregular pieces are situated on either side of the short radial. They are scarcely more than half the width of the others, and only one of the lateral edges is crenulated.

*Pseudoambulacral areas.* The four linear areas are convex, and project above the plane of the interradial plates. The *pore pieces* are transverse, sub-pentagonal and finely crenulated at their internal edges. Their surfaces are deeply indented, and their number on each side of a field amounts to about thirty-five. The supplementary pore pieces are sub triangular and very minute. The fifth or anomalous area is small, triangular, and situated on the summit plane just within and a little below the superior edge of the short radial piece. The pore pieces are transverse, wide, and amount to about seven on each side of a field. Their form and that of the supplementary pore pieces cannot be well made out in the specimens on hand. The apertures situated at the extremities of the pieces amount to about fourteen for the entire field.

The *Eleutheroocrinus Casedayi* is the only known species of the genus.

#### References to Plate II.

- Fig. 1. Profile view of a specimen four times enlarged.
2. Opposite view of the same, exhibiting the form of the short radial, and the prolonged part of the long basals.
3. Basal view.
4. Summit view, showing the anomalous pseudo-ambulacral field.
5. A portion of one of the linear pseudo-ambulacral fields, very much enlarged.

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The report of the Corresponding Secretary for February and March was read and adopted.

On motion of Dr. Elwyn, it was *Resolved*, That the members of the Methodist Conference, about to convene in this city, be invited to visit the Museum of the Academy on public days, during the session of the Conference.

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#### ELECTION.

Mr. James E. Caldwell, Dr. Charles M. Cresson and Mr. A. J. Brasier, all of Philadelphia, were elected *Members*, and  
Dr. F. V. Hayden, of St. Louis, Mo., was elected a *Correspondent*.